Malayan Nature Journal 2012, 64(1), 9-32

The Araceae of Indomalaya II: *Piptospatha* N.E.Br.

PETER C. BOYCE[1*] AND WONG SIN YENG[2]

A review of the genus *Piptospatha* N.E.Br. is presented with new generic boundaries implemented since the last full revision. 10 species are recognized, two of them (*P. marginata* (Engl.) N.E.Br. & *Piptospatha repens H.Okada & Tsukaya*) only recently recognized as distinct species. A key to species is given and species are illustrated, the majority from living plants.

Keywords: Araceae, *Piptospatha*, Schismatoglottideae, Indomalaya, Sunda, Borneo

INTRODUCTION

Piptospatha is a genus of 10 described species of obligate rheophytes occurring along streams and on waterfalls in lowland to lower montane perhumid to everwet tropical broadleaf forest. Currently there are 10 described accepted species. Two of these (*P. perakensis* (Engl.) Ridl. & *P. ridleyi* N.E.Br.) occur in West Malaysia, with one of these (*P. perakensis*) extending into southern Peninsular Thailand. The remainder are endemic on Borneo, with one species (*P. viridistigma* P.C.Boyce, S.Y.Wong & Bogner) recorded from the Aru Islands (Bogner, pers. comm.), but this requiring confirmation. Study of the significant herbarium collections in Leiden (L) and Herbarium Bogoriense (BO) has revealed at least another 5 species awaiting formal description. Unfortunately none of the material is of insufficient quality to permit description of these novelties.

Most species are restricted to specific geologies, for example: sandstone (e.g., *P. impolita* P.C.Boyce, S.Y.Wong & Bogner), shales (e.g., *P. marginata* (Engl.) N.E.Br.), granite (e.g., *P. elongata* (Engl.) N.E.Br.), karst limestone (e.g., *P.viridistigma*), and travertine (*P. manduensis* Bogner & A.Hay).

The most recent complete taxonomic revision of *Piptospatha* is Bogner & Hay (2000). However, generic boundaries proposed there are now considerably

Manuscript received: 28 November 2011
Manuscript accepted: 4 January 2011
1 School of Biological Sciences, Universiti Sains Malaysia 11800 USM, Pulau Pinang, Malaysia.
2 Department of Plant Science & Environmental Ecology, Faculty of Resource Science & Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia.
* Corresponding author. Email: phymatarum@gmail.com

altered following combined molecular and morphological analyses. Key changes are:

Removal (and resurrection to generic status) of *Hottarum truncatum* (M.Hotta) Bogner & Nicolson (Low et al., unpubl. data)

Recognition of two new genera based on species previously included in *Piptospatha*:
Bakoa P.C.Boyce & S.Y.Wong (Boyce & Wong, 2008; Wong 2011)
Ooia S.Y.Wong & P.C.Boyce (Wong & Boyce, 2010)

Additional novel species: *P. impolita* and *P. viridistigma* (Wong et al., 2009), and *P. repens* H.Okada & Tsukaya (Okada & Tsukaya, 2010)

Resurrection of *P. marginata* (Wong et al., 2011)

Problems remain, however. Critically, the type species (*P. insignis* N.E.Br.) has never been recollected, and is yet to be sampled for molecular analysis; attempts to isolate DNA from the type material have failed. *Piptospatha insignis* has staminate flowers of unique morphology, and this together with the free pistils set it apart from all other species.

Preliminary molecular analysis of *P. perakensis* has shown it to fall outside the clade to which all *Piptospatha* species belong (Ooi, unpublished data). Combined with a suite of unique morphologies this lends much support to the removal of *P. perakensis* from *Piptospatha*, and into a new genus; a decision awaits further supporting molecular evidence from ITS.

Piptospatha is now defined by the combination of ligular petiolar sheathes, shedding spathe limb, thecae lacking a horn- or needle-like structure, parietal placentation, an erect splash cup carried on an erect peduncle, fruits either fused into a syncarpium (most) or free but cohering (*P. insignis*), and the presence of micropylar appendage on the seed.

Piptospatha N.E.Br., *Gard. Chron., n.s.* 11: 138, fig.20 (1879); Engler in A.L.P.de Candolle & A.C.P.de Candolle, *Monogr. Phan.* 2: 644–645 (1879); Brown in G.**Bentham** & J.D.**Hooker**, *Genera Plantarum* 3(2): 985 (1883); Engler in H.A.G.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.* 2(3): 132. (1889); Ridley, *Mat. Fl. Malay. Penins.*: 34–35. 1907; Engler in H.G.A.Engler, *Pflanzenr.* 55(IV.23Da) 124–128, Fig.75 (1912); Ridley, *Fl. Mal. Pen.* 5: 114 (1925); Mayo et al, *Genera of Araceae* 184–187,

Map 50, Pl.50 & 117D (1997); Bogner & Hay, *Telopea* 9(1): 201–218 (2000); Wong et al., *Gard. Bull. Sing.* 61(1): 221–238. (2009); Wong & Boyce, *Bot. Stud. (Taipei)* 51: 543–552 (2010); Wong et al., *Webbia* 66(1): 29–32 (2011). **Type:** *Piptospatha insignis* N.E.Br.

Rhynchopyle Engl., *Bot. Jahrb. Syst.* 1: 183 (1880 ‘1881’). Lectotype: *Rhynchopyle elongata* (Engl.) Engl. [= *Piptospatha elongata* (Engl.) N.E.Br.] (selected by Nicolson, 1967: 518).

Gamogyne N.E.Br., J. Bot. 20: 195 (1882); Engler in H.G.A.Engler, *Pflanzenr.* 55(IV.23Da): 123 (1912). — *Piptospatha* sect. *Gamogyne* (N.E.Br.) M.Hotta, *Mem. Coll. Sci. Univ. Kyoto, Ser. B*, 32: 26 (1965). Type: *Gamogyne burbidgei* N.E.Br. [= *Piptospatha burbidgei* (N.E.Br.) M.Hotta].

Small to medium-sized evergreen obligate rheophytes; *Stem* erect or decumbent, usually more or less condensed. *Leaves* several; petiole semi-terete to canaliculate on upper side; *petiolar sheath* short with long, marcescent ligule; *leaf blade* elongate-lanceolate to elliptic or oblonceolate, coriaceous, basally cuneate, apex with tubular mucro; *primary lateral veins* pinnate, running into distinct marginal vein, *secondary laterals* and *higher order venation* either parallel-pinnate or tessellate. *Inflorescence* solitary per module, emerging orthotropic, maturing (prior to the onset of anthesis) anatropic; *peduncle* subequal to or longer than petiole; *spathe* stoutly ellipsoid, not constricted, usually pink, rarely white, lower part persistent and cup-like, upper part inflating and then gaping at anthesis, soon-caducous, cuspidate to acuminate, often with a pronounced terminal rostrum becoming reflexed at anthesis, interior frequently with one to several pronounced crests, especially in the distal part; *spadix* sessile with oblique insertion, often with *staminodes* basally; *pistillate flower zone* cylindric; *pistils* connate into a syncarpium, or free but cohering to neighbouring ones; *ovary* 1-locular; *ovules* many, placenta 2–4, parietal; *stigma* ± sessile, usually as broad as ovary and more or less contiguous with adjacent ones; *staminate flower zone* contiguous with pistillate, cylindric to ellipsoid, equal in thickness to pistillate, obtuse; *stamens* arranged in pairs or irregular, free, compressed, anthers truncate, connective ± flat or expanded apically or with conspicuous conical beak overtopping thecae; *thecae* oblong-ellipsoid, dehiscing by apical pore; *appendix* absent. *Infructescence* a cluster of berries subtended by a narrow to wide-flaring obconic spathe base carried on an erect peduncle, spadix above fruiting portion degrading and shed entirely soon after fertilization; *berry* obovoid to subcylindric, small, green, either fused into a syncarpium (most species), or free but cohering to adjacent berries. *Seed* numerous, elongate-ellipsoid to cylindric, with long, curved micropylar appendage, testa slightly costate, embryo elongate, endosperm copious.

KEY TO *PIPTOSPATHA*

1a. Sterile interstice between pistillate and staminate flower zones well-defined 2a. Stem short, erect; spadix thick (width of pistillate zone: entire length = 5/18); pistillate zone green, staminate zone pale yellow; N Borneo (Sarawak: Limbang, Brunei, W Sabah) ..... *P. burbidgei*

2b. Stem long, repent, spadix slender (width of pistillate zone: whole length = 3/30), pink; N Kalimantan Tengah ..... *P. repens*

1b. Sterile interstice absent or very ill-defined 3

3a. Anther connective extended into a pronounced elongate beak; “North Borneo” .... *P. insignis*

3b. Anther connective not so, or if elevated then shortly so and obtuse 4